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AUTHOR Slemon, Jill C.; Shafrir, Uri

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ABSTRACT

Predicted and actual scores on subtests of the Wechsler Adult Intelligence Scale-Revised (WAIS-R) and the Wide Range Achievement Test-Revised (WRAT-R) were obtained from 40 normally achieving postsecondary students (NA) and 92 adult students with learning disabilities (LD). LD students had major deficits in reading-related areas. It was hypothesized that, in their perceived deficit areas, students with LD would have different response patterns than NA students; that is, they would tend to have accurate estimates or underestimates of their responses, while NA students would tend to overestimate their performance on various tasks, as predicted by the work of A. Bandura (1989). It was also predicted that in their nonperceived deficit areas, students with LD would tend to have response patterns similar to those of NA students. Repeated measures analysis of variance found significant three-way interactions by group for predicted/actual scores by subtests for the WRAT-R and the WAIS-R. In the Reading subtest of the WRAT-R and in three of the WAIS-R verbal subtests, the first hypothesis was supported unambiguously. Students with LD had accurate predictions, while NA students overestimated significantly. In the Performance section of the WAIS-R, the second hypothesis was also supported. Differences between predicted and actual scores were similar for both groups. Implications for research and practice are discussed. (Contains 2 figures, 3 tables, and 19 references.) (Author/SLD)

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Academic Self-Efficacy of Post-Secondary Students With and Without Learning Disabilities

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Jill C. Slemon

and

Uri Shafrir

TM027564

Presented at the annual meeting of the American Educational Research Association, Chicago, March, 1997. Correspondence should be addressed to: Jill Slemon, 34 Normandy Gardens, London, Ontario, N6H 4A9, CANADA.

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Abstract

This study compares predicted and actual scores on subtests of the WRAT-R and WAIS-R obtained from post-secondary normally-achieving (NA) students and students with learning disabilities (LD). Bandura (1989) reported that normals tend to overestimate their performance on various tasks. By overestimation, Bandura meant that predicted scores tend to be higher than actual scores. Overestimates are therefore assumed to be functional, whereas accurate estimates or underestimates of ability in specific tasks may inhibit mastery and self-efficacy (Bandura, 1989, Taylor and Brown, 1988). Students with LD in the present study had major deficits in reading-related areas (e.g., reading comprehension, writing).

First, it was hypothesized that in their **perceived deficit** areas, students with LD would have **different** response patterns than NA students (i.e., students with LD would tend to have accurate estimates or underestimates, whereas NA students would tend to overestimate). Second, it was predicted that in their **nonperceived deficit** areas, students with LD would tend to have **similar** response patterns to NA students.

Repeated measures ANOVAs found significant three-way interactions for Group by Predicted/Actual Scores by Subtests for the WRAT-R and WAIS-R. In the Reading subtest of the WRAT-R and in three of the subtests from the Verbal section of the WAIS-R, hypothesis 1 was unambiguously supported: students with LD had accurate predictions whereas NA students overestimated significantly. In the Performance section of the WAIS-R, hypothesis 2 was unambiguously supported: differences between predicted and actual scores were similar in both groups. Implications of the findings for future research and practice are discussed.

Academic Self-Efficacy of Post-Secondary Students With and Without Learning Disabilities

Predicted and actual scores of post-secondary normally-achieving (NA) students and students with learning disabilities (LD) are compared on WRAT-R and WAIS-R subtests. Bandura's theory of self-efficacy was used as the framework for the investigation. Self-efficacy is defined as the belief that one can execute specific behaviors that will produce successful outcomes (Bandura, 1977). Further, Bandura (1989) states that: (a) "so called normals" tend to overestimate and (b) accurate estimates or underestimates of ability may limit mastery and self-efficacy. Researchers found that college students generally overestimate (Pajares, 1996, Pajares and Miller, 1994).

Self-efficacy and severity of learning disabilities. Learning disability is a very complex concept. People with LD may have severe, marked problems in specific areas, but in other areas they may be indistinguishable from NA groups (for a discussion of severity indices and problems in diagnosing adults, see Stanovich, 1988, 1991). The expression "learning disabilities" refers to severe processing difficulties that hinder learning. Special instructional accommodations are required such as taped texts, extra time, modified tests, and so forth. Even when such assistance is received, students often find the work very taxing (Crux, 1991). Different students may display academic deficits in quite independent areas, and so comprehensive assessment necessitates a range of formal and informal measurement techniques (Hawks, 1996; Hoy et al., 1996).

Although studies of self-efficacy are being conducted with children having learning problems (see Schunk, 1989), little research has been done with adults having LD. Saracoglu, Minden, and Wilchesky, 1989, reported that university students with LD had significantly lower general self-efficacy than

NA students. Self-efficacy theory suggests that students with LD may have lower self-efficacy than NA students in specific areas where there are histories of repeated failure.

Optimistic appraisals of ability are expected to be adaptive (Bandura, 1986, 1989). However, overestimation is maladaptive when: (a) it is overly-exaggerated, and (b) acting upon unrealistic beliefs has disastrous consequences (Bandura, 1989). Both limitations must be considered when examining overoptimistic appraisals in self-efficacy research.

Questions to be Investigated

Two questions were explored.

1. In their **perceived deficit** areas, will the group with LD have **different** responses than the NA group (i.e., will the group with LD tend to have either accurate estimates or underestimates, while the NA group tends to overestimate); and
2. In their **perceived nondeficit** areas, will the group with LD have **similar** responses to the NA group?

Overestimation, Underestimation, and Accurate Estimation

For the purposes of this study, accurate estimation was defined as no significant difference between predicted and actual scores, overestimation was defined as a significant positive difference between predicted and actual scores, and underestimation was defined as a significant negative difference between predicted and actual scores.

Method

Subjects

All post-secondary students used in this study had: (a) English as their first language, (b) IQs of 85 or above, and (c) no primary emotional problems. The majority of students were enroled in Social Sciences and Humanities

undergraduate programs. The mean age for both groups was 26.

There were 40 NA volunteer students (**n** = 20 men, **n** = 20 women). Initial screening showed that no students had received psychoeducational testing for learning problems, none had been placed in remedial classes, none experienced severe current learning difficulties, and none perceived themselves as having learning disabilities. There were 92 students with LD (**n** = 51 men, **n** = 41 women). These students sought assistance from the Adult Study Skills Clinic due to severe problems in one or more areas (e.g., reading, writing, arithmetic). Students with LD had experienced constant severe academic difficulty dating back to public school. They also scored below the 40th percentile on four or more of the 21 psychoeducational subtests examined. (On average, their scores were below the 40th percentile on seven subtests).

Measures

Learning History Questionnaire. Students with LD reported the reasons they sought assistance from the Adult Study Skills Clinic. Writing essays, writing essay examinations, and reading were reported by 68 to 80 percent of the sample as problems persisting from youth to adulthood (see Table 1).

Self-Estimate Test. Bandura (1984) stated that "in thought, the types of outcomes people anticipate depend largely on their judgments of how well they are able to perform in given situations" (p. 235). The Self-Estimate Test of Intellectual Functioning and Academic Achievement (Shafrir, 1994) measured students' judgments of how well they would perform on the WAIS-R and WRAT-R subtests. Each subtest was described concisely and then illustrated briefly by an easy and a difficult example. Students predicted their accuracy of response on a relative scale from 1 to 19 (1 = much worse than people my age, 10 = as well as people my age, 19 = much better than people my age).

The WAIS-R and WRAT-R were then administered and actual subtest scores

Table 1

Presenting Problems of LD Students, (N=92)

Presenting Problem	A Problem	Not A Problem
Reading	62 (67.39)	30 (32.61)
Spelling	45 (48.91)	47 (51.09)
Arithmetic	50 (54.35)	42 (45.65)
Writing Essays	74 (80.43)	18 (19.57)
Speaking	15 (16.30)	77 (83.70)
Essay Exams	72 (78.26)	20 (21.74)
Multiple Choice Exams	31 (33.70)	61 (66.30)
Note Taking	23 (25.00)	69 (75.00)
Organization	33 (35.87)	59 (64.13)
Time Management	39 (42.39)	53 (57.61)
Concentration	38 (41.30)	54 (58.70)
Memory	53 (35.87)	59 (64.13)
Visual Processing	12 (13.04)	80 (86.96)
Anxiety	38 (41.30)	54 (58.70)

Note. Counts reported first; percentages reported in parentheses.

obtained. Predicted and actual scores were transformed to standard scores with a mean of 100 (M=100) and a standard deviation of 15 (s=15).

Procedure

Students were assessed individually. They completed the questionnaire, predicted their ability on the subtests, and then completed the actual tests. (Students with LD were administered the remaining test battery after completing this phase). Criterion measures were the standardized predicted scores on the Self-Estimate subtests and the standardized actual scores on the WAIS-R and WRAT-R subtests.

Results

Overview of Analyses of Self-Efficacy Measures

Separate profile analyses were conducted on the WAIS-R and WRAT-R tests because they were normed on different groups. A 2 (NA versus LD group) by 2 (predicted/actual scores) by 3 (subtests; WRAT-R) and a 2 (NA versus LD group) by 2 (predicted/actual scores) by 9 (subtests; WAIS-R) repeated measures analyses of variance (ANOVA) were performed. Post-hoc t tests were calculated for significant interactions. Significance levels were adjusted using the Bonferroni procedure to control for Type I Error associated with multiple t tests.

Self-Efficacy on the WRAT-R

The three-way interaction was significant ($F(2,260) = 3.82$, $p<.05$), and so predicted and actual scores for both groups were compared at each level of subtest. Table 2 shows the means, standard deviations, and t tests, and Figure 1 plots the means for each subtest.

In Reading, as predicted, the NA group significantly overestimated, whereas the group with LD had an accurate estimate. In Spelling, the NA group had an accurate estimate, while the group with LD underestimated

Table 2 Means, Standard Deviations, and t Tests Comparing Predicted with Actual Scores for NA and Total LD Group, WRAT-R

	NA (n=40)			LD (n=92)		
	Pred	Act	t	Pred	Act	t
Reading	119.88 (17.00)	113.93 (05.19)	2.53*	104.49 (18.96)	105.87 (12.49)	-0.89
Spelling	115.00 (19.64)	113.23 (08.85)	0.75	98.04 (20.70)	101.98 (13.21)	-2.55*
Arithmetic	110.63 (19.88)	108.30 (14.69)	0.99	101.68 (22.36)	98.45 (14.41)	3.37**

Table 3 Means, Standard Deviations, an t Tests Comparing Predicted with Actual Scores for NA Group with LD, WAIS-R

	NA (n=40)			LD (n=92)		
	Pred	Act	t	Pred	Act	t
Information	117.25 (16.98)	104.75 (10.80)	5.28**	112.66 (18.61)	102.83 (12.10)	6.29**
Digit Span	111.75 (14.44)	111.25 (11.81)	0.21	94.40 (18.42)	100.22 (11.83)	-3.73**
Vocabulary	117.88 (16.64)	107.75 (11.60)	4.28**	105.05 (17.70)	106.14 (11.17)	-0.70
Arithmetic	117.63 (20.41)	106.75 (10.53)	4.59**	99.24 (19.07)	100.22 (11.97)	-0.63
Similar.	113.88 (14.74)	107.75 (11.03)	2.59*	108.21 (16.38)	105.27 (11.25)	1.88
Pic. Comp.	112.13 (12.90)	99.25 (10.41)	5.44**	107.77 (18.20)	101.30 (11.81)	4.14**
Block Des.	112.75 (19.45)	110.25 (11.21)	1.06	108.64 (19.61)	109.73 (15.56)	-0.70
Object A.	113.63 (13.49)	102.63 (09.87)	4.64**	113.32 (15.95)	104.08 (15.23)	5.92**
Digit Sym.	120.63 (16.36)	107.75 (11.03)	5.44**	114.08 (17.79)	99.08 (12.51)	9.60**

Note. Pred = Predicted, Act = Actual

Standard deviations are in parentheses.

* p<.05

**p<.01

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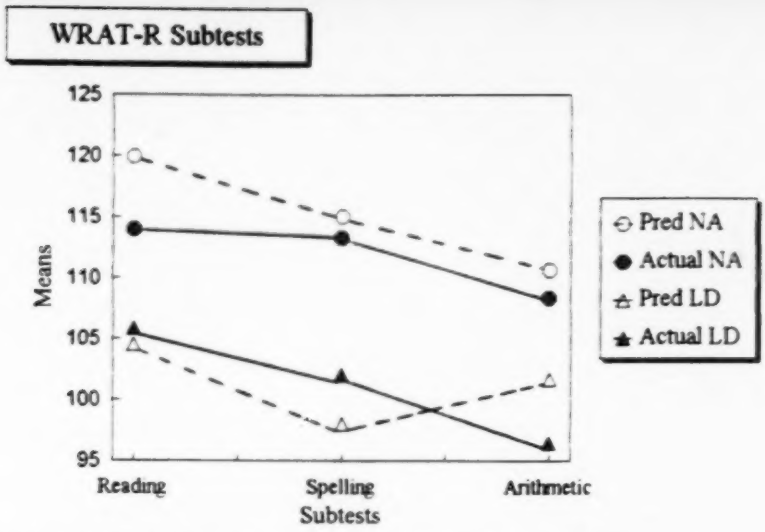
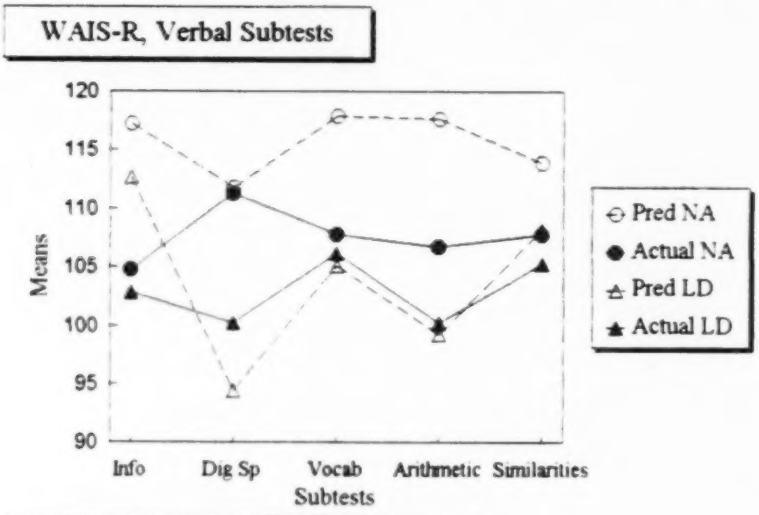


Figure 1. Three-way interaction of predicted and actual scores for NA group and group with LD, WRAT-R subtests.



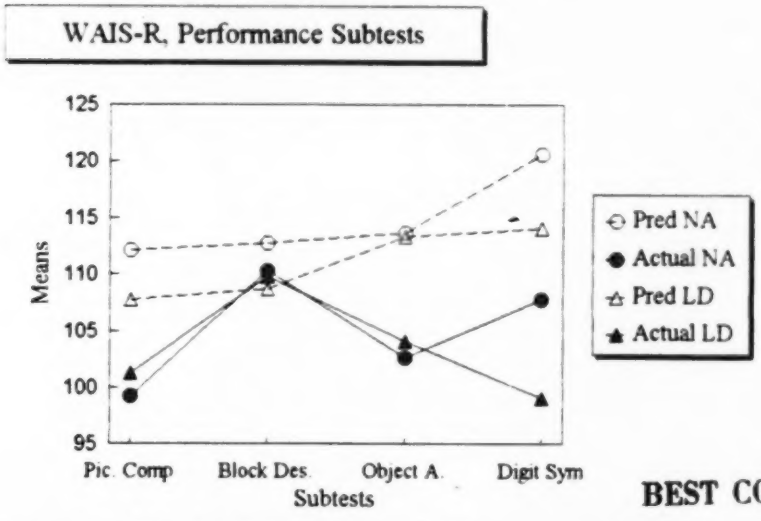


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Figure 2. Three-way interaction of predicted and actual scores for NA group and group with LD, WAIS-R Verbal (above) and Performance (below) subtests.

significantly. In Arithmetic, the results were opposite to what was expected: the group with LD overestimated significantly, while the NA group estimated accurately.

Self-Efficacy on the WAIS-R

The three-way interaction was significant ($F(8,1040) = 2.50$, $p<.01$), and so predicted and actual scores for both groups were compared on each subtest.[1] Table 3 shows the means, standard deviations, and t tests, and Figures 2A and 2B plot the means for the Verbal and Performance subtests, respectively.

Self-efficacy on Verbal subtests. The group with LD unlike the NA group had a history of deficits related directly to verbal skills, and so it was expected that the groups would respond as indicated in hypothesis 1. Three of the five WAIS-R Verbal subtests supported hypothesis 1 unambiguously: in Vocabulary, Arithmetic, and Similarities, the NA group overestimated significantly, whereas the group with LD had accurate estimates. In Digit Span, the NA group had accurate estimates, while the group with LD underestimated significantly. In Information, both groups overestimated significantly.

Self-efficacy on Performance subtests. Performance tests are less related to academic deficits than Verbal subtests, and so hypothesis 2 predicted that the groups would have comparable response patterns. In Picture Completion, Object Assembly, and Digit Symbol both groups significantly overestimated, and in Block Design, both groups had accurate estimates. Hypothesis 2 was supported unambiguously on all Performance subtests.

Discussion

Implications for Learning Disability

It was hypothesized that in their perceived deficit area, students with LD would have a different response pattern than NA students, whereas in the

nondeficit area of the group with LD, both groups would have similar response patterns. Bandura (1986) postulated that interpretations of past performances influence efficacy expectations, and that "normals" tend to overestimate (Bandura, 1989). The students with LD had a history of failure in specific reading-related areas, and as expected (a) they were less likely than the NA group to overestimate in deficit-related areas, and (b) they responded similarly to the NA group in nondeficit areas.

This study indicates that although students with LD are motivated (i.e., they possess perseverance and capacity permitting admission to college) they nonetheless tend to lack the optimistic beliefs about ability of the NA students. This finding was particularly evident in the WRAT-R Reading subtest and in three of the WAIS-R Verbal subtests. Approaches to remedial education tend to concentrate upon skill acquisition (Crux, 1991). However, self-efficacy theory suggests that instructors should be equally attentive to developing optimal levels of self-efficacy in areas of perceived deficit.

Implications for Measurement

The procedure for measuring self-efficacy used in this study may be viewed as permitting more focused measures of self than have traditionally been employed in self-concept research (see Hattie, 1996). Self-concept studies tend to rate relatively broad areas of self (e.g., achievement in social studies), whereas the present measures involve predictions of performance in more restricted contexts. Respondents were given a clear depiction of a subtest. This approach also permits comparisons between predicted (subjective) measures and actual (objective) measures.

Conversely, the present procedure extends the microanalytic procedures of self-efficacy research (Bandura, 1977, Schunk, 1989). In self-efficacy studies, a specific academic area is targeted and a set of related test items

are prepared (Bandura & Schunk, 1981; Pajares & Miller, 1994). Estimates of accomplishment are obtained prior to and following administration of each item. Pre- and post-estimates and actual scores are compared in order to investigate changes among treatment groups. In this study, there is no treatment, and relative predicted scores are compared with normed actual scores on each subtest. Self-efficacy measures are extended from the level of items to the level of subtests. Further, achievement and aptitude tests were used to measure various dimensions of behavior. Despite variations in methodology, self-efficacy theory appears to generalize quite well. The hypotheses were mainly supported: the NA group was more likely to overestimate in WAIS-R Verbal tasks than the group with LD, while both groups displayed similar patterns of estimation in WAIS-R Performance tasks. In the WRAT-R Reading Subtest, the NA group overestimated whereas the group with LD estimated accurately.

Limitations of the Study

In some subtests, lack of support for the hypotheses may be related to measurement problems. The WRAT-R Arithmetic items are so diverse that the description and examples were insufficient to represent the content (i.e., the easy example was a one-digit subtraction question and the difficult example was a quadratic equation while the subtest also samples many other areas of mathematics). Therefore, negative findings should be interpreted cautiously. A recommendation would be to employ mathematics subtests that are limited to one area (e.g., fractions). Difficulty levels of the Information and Digit Symbol subtests may not have been adequately communicated. (An item analysis suggests that the difficult example in Information was relatively easy, and in Digit Symbol the influence of timing on difficulty may not have been fully conveyed). A further improvement might be to compare Digit Span Forwards and

Backwards separately, rather than pooling the scores, as done in the WAIS-R. In the WRAT-R Spelling and WAIS-R Digit Span, the NA group had accurate estimates and the group with LD underestimated significantly (a result which was in the expected direction). Possibly, the NA group responded accurately because both tests consist of highly observable, unambiguous tasks. Finally, the measurement scale of 1 to 19 used by students was anchored at three separate points. More objective measures may be obtained by anchoring interval boundaries at 1, 2, and 3 standard deviations above and below the mean thereby relating the self-estimates to the WAIS-R scaled scores.

Future Avenues of Research

Several lines of investigation emerge from this initial study. First, obtaining post-dictions after completing the WAIS-R and WRAT-R would help to determine whether change occurs as a result of task performance (see Glenberg & Epstein, 1984; Maki & Berry, 1984; Pressley, Ghatala, Woloshyn, & Pirie, 1990 for studies of students' post-test beliefs). Second, employing <u>self-efficacy for learning</u> measures (Schunk, 1989) would give tutors a sense of how learning may be received by students. Third, parental or spousal predictions of students' ability could be obtained and compared with students' predicted and actual scores using the Self-Estimate procedure. Such estimates may provide valuable information regarding levels of environmental expectations and support for students. In this study gender did not significantly affect the interactions being studied,[2] however, gender differences in academic areas are still of interest to researchers. Finally, during remediation, combining process counselling with pre and post self-efficacy measures might provide insight into the development of self-efficacy during skill training. More research needs to be done in this area to understand the influences of self-efficacy upon adult students with learning disabilities.

Footnotes

1. For the WAIS-R test, separate repeated measures ANOVAs were done on the Verbal and Performance sections to test hypotheses 1 and 2 more specifically. A 2 (NA versus LD) by 2 (predicted/actual scores) by 5 (Verbal subtests) and a 2 (NA versus LD) by 2 (predicted/actual scores) by 4 (Performance subtests) analyses of variance were examined. There was a significant 3-way interaction for the Verbal section ($F(4,520) = 2.75$, $p<0.03$) which supports hypothesis 1. The three-way interaction for the Performance section was not significant ($F(3,390) = 1.51$, $p>.05$). There were two significant two-way interactions, Predicted/Actual Scores by Tests ($F(3,390) = 14.83$, $p<.001$), and Tests by Group ($F(3,390) = 5.10$, $p<.002$). However, consistent with hypothesis 2, there was no significant two-way Predicted/Actual Scores by Group interaction ($F(1,130) = 0.92$, $p>.05$), and the mean of the predicted scores (112.87) surpassed the mean of the actual scores (104.26).

2. In a repeated measures analysis of variance for the factors Gender by Group by Predicted/Actual Scores by Subtests, there was no significant four-way interaction for the WRAT-R ($F(2.256) = 2.13$, $p>.05$), or for the WAIS-R ($F(8, 1024) = 0.58$, $p>.05$).

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